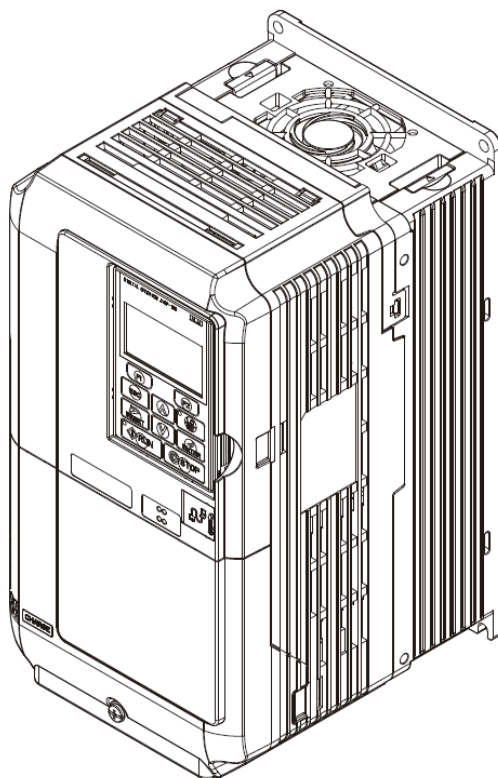


# YASKAWA L1000A

## Lift Application

## Short EN Manual



**VERSION V1**  
**(REV 1.1)**

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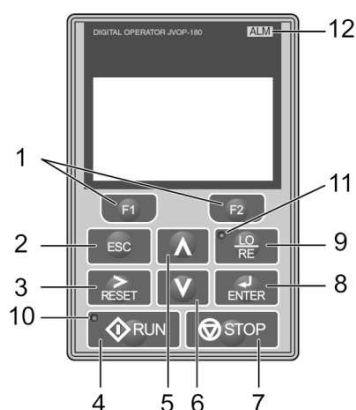
email: [info@istechology.gr](mailto:info@istechology.gr)  
URL: [www.istechology.gr](http://www.istechology.gr)

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## 1) Digital Operator Panel JVOP-180

You can set Inverter's parameters or monitoring functions with the Digital operator panel, shown at Figure -1-.



**Figure -1-**  
*Digital Operator Component  
Names and Functions*

### A. Digital Operator keys

#### *Key Functions*

Key	Name	Function
	Function Key F1	The functions assigned to F1 and F2 vary depending on the menu that is currently displayed. The name of each function appears in the lower half of the display window.
	Function Key F2	
	ESC Key	<ul style="list-style-type: none"> <li>• Returns to the previous display.</li> <li>• Moves the cursor one space to the left.</li> <li>• Pressing and holding this button will return to the Speed Reference display.</li> </ul>
	RESET Key	<ul style="list-style-type: none"> <li>• Moves the cursor to the right.</li> <li>• Resets the drive to clear a fault situation.</li> </ul>
	RUN Key	Starts the drive in the LOCAL mode. The Run LED <ul style="list-style-type: none"> <li>• is on, when the drive is operating the motor.</li> <li>• flashes during deceleration to stop or when the speed reference is 0.</li> <li>• flashes quickly the drive is disabled by a DI, the drive was stopped using an emergency stop DI or an up/down command was active during power up.</li> </ul>
	Up Arrow Key	Scrolls up to display the next item, selects parameter numbers and increments setting values.
	Down Arrow Key	Scrolls down to display the next item, selects parameter numbers and increments setting values.
	STOP Key	Stops drive operation.
	ENTER Key	<ul style="list-style-type: none"> <li>• Enters parameter values and settings.</li> <li>• Selects a menu item to move between displays.</li> </ul>
	LO/RE Selection Key	Switches drive control between the operator (LOCAL) and the control circuit terminals (REMOTE). The LED is on when the drive is in the LOCAL mode (operation from keypad).
	RUN Light	Lit while the drive is operating the motor.
	LO/RE Light	Lit while the operator is selected to run the drive (LOCAL mode).

**B. Example setting parameter (C1-02).**

This example explains changing C1-02 (Deceleration Ramp 1) from 1.50 seconds (default) to 2.50 seconds.

STEP			Display/Result
1.	Turn on the power to the drive. The initial display appears.	▶	
2.	Press the  or  key until the Parameter Setting Mode screen appears.	▶	
3.	Press the  key to enter the parameter menu tree.	▶	
4.	Press the  or  key to select the C parameter group.	▶	
5.	Press the  key two times.	▶	
6.	Press the  or  key to select the parameter C1-02.	▶	
7.	Press the  key to view the current setting value (1.50 s). Left digit flashes.	▶	
8.	Press ,  or  until the desired number is selected. "1" flashes.	▶	
9.	Press the  key and enter 002.50.	▶	
10.	Press the  and the drive will confirm the change.	▶	
11.	The display automatically returns to the screen shown in Step 4.	▶	
12.	Press the  key until back at the initial display.	▶	

## 2) PG Option Cards Connection

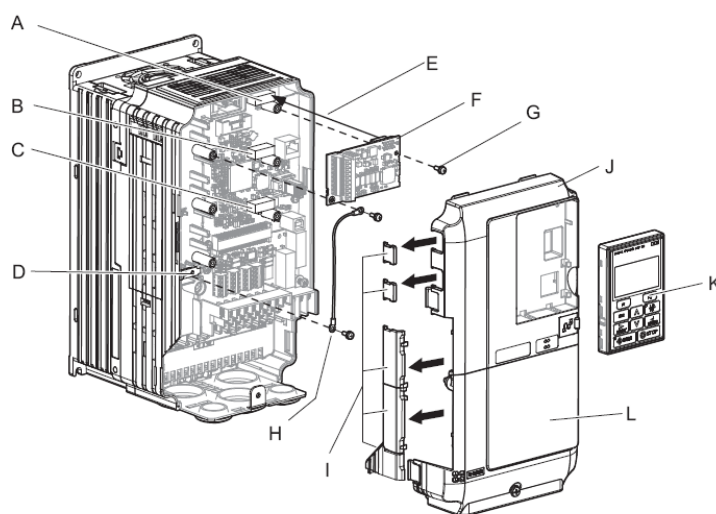
**WARNING!** *Electrical Shock Hazard. Do not allow unqualified personnel to perform work on the drive. Failure to comply could result in death or serious injury. Maintenance, inspection, and replacement of parts must be performed only by authorized personnel familiar with installation, adjustment and maintenance of AC drives and Option Cards.*

**NOTICE:** *Damage to Equipment. Observe proper electrostatic discharge procedures (ESD) when handling the option card, drive, and circuit boards. Failure to comply may result in ESD damage to circuitry.*

**NOTICE:** *Damage to Equipment. Tighten all terminal screws to the specified tightening torque. Failure to comply may cause the application to operate incorrectly or damage the drive.*

Use the procedure described below when installing option cards to the drive.

1. Shut off power to the drive, wait the appropriate amount of time for voltage to dissipate, then remove the operator and front cover.
2. Insert the CN5 connector on the option card into the matching CN5 connector on the drive, then fasten it into place using one of the screws included with the option card.



A – Connector CN5-C  
B – Connector CN5-B  
C – Connector CN5-A

D – Drive grounding terminal (FE)  
E – Insert connector CN5 here  
F – Option card

G – Mounting screw  
H – Lead line  
I – Use wire cutters to create an opening for cable lines  
J – Front cover  
K – Digital operator  
L – Terminal cover

There are two types of PG Option Cards. One type for Gearless Synchronous Motors and Geared Asynchronous motors, PG-X3. And one type only for gearless synchronous motor, PG-F3.

#### A. PG Option Card for asynchronous Geared Motors.

##### 1. Wiring the PG-X3.

This PG Option Card is used with three phases encoders. The terminal specifications for the PG-X3 are given in the following table:

Terminal Block	Terminal	Function	Description
TB1	A+	A+ pulse signal input	<ul style="list-style-type: none"> <li>Inputs for the A, B, and Z pulses from the PG</li> <li>Signal level matches RS-422</li> </ul>
	A-	A- inverse pulse input	
	B+	B+ pulse signal input	
	B-	B- inverse pulse input	
	Z+	Z+ pulse signal input	
	Z-	Z- inverse pulse input	
	SD	NC pin (open)	For use when cables shields should not be grounded
	FE	Ground	Used for grounding shielded lines
TB2	IP	PG power supply	<ul style="list-style-type: none"> <li>Output voltage: 12.0 V <math>\pm</math> 5% or 5.5 V <math>\pm</math> 5%</li> <li>Max. output current: 200 mA</li> </ul>
	IG	PG power supply common	
	SG	Monitor signal common	<ul style="list-style-type: none"> <li>Output signal for monitoring A, B, and Z pulses from the PG</li> <li>Signal level matches RS-422</li> </ul>
	a+	A pulse monitor signal	
	a-	A pulse inverse monitor signal	
	b+	B pulse monitor signal	
	b-	B pulse inverse monitor signal	
	z+	Z pulse monitor signal	
	z-	Z pulse inverse monitor signal	


#### Wiring Example for geared Asynchronous motor

This example is use a LIKA i58H1024ZCU incremental encoder. First note the correspondence of cables and their colors. This correspondence is written on the encoder. For example, on the encoder is written:

+12Vdc	0V	A	B	$\bar{A}$	$\bar{B}$
Red	Black	Yellow	Green	Blue	Orange

Jumper CN3, on the PG-X3 card, determines the voltage for the PG power supply. The voltage level is set by the positioning the jumper as shown below.

PG Power Supply Voltage (IP)		
Voltage Level	5.5 V 5% (default)	12.0 V 5%
Jumper	<div> <div>5.5 V</div> <div>12 V</div> </div> <div> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> </div>	

On Block terminal TB1 of PG-X3, the terminal A+ corresponds to phase A, so this terminal should be connected with the encoder's YELLOW cable. The encoder power supply should be 12Vdc, and this voltage must be selected from the jumper CN3. The jumper CN3 must be on the position for 12Vdc .

The wiring of PG-X3 with LIKA i58H1024ZCU encoder is like the table below:

Terminal Block	Terminal	Function	Description
TB1	A+	YELLOW	<ul style="list-style-type: none"> <li>Inputs for the A and B from the PG</li> <li>Signal level matches RS-422</li> </ul>
	A-	BLUE	
	B+	GREEN	
	B-	ORANGE	
	FE	SHIELD	Used for grounding shielded lines
TB2	IP	RED	<ul style="list-style-type: none"> <li>Output voltage: 12.0 V <math>\pm</math> 5% or 5.5 V <math>\pm</math> 5%</li> <li>Max. output current: 200 mA</li> </ul>
	IG	BLACK	

## B. PG Option Card for Synchronous Gearless Motors with Incremental Encoder.

### 1. Wiring the PG-X3.

This PG Option Card is used with three phases encoders. The terminal specifications for the PG-X3 are given in the following table:


Terminal Block	Terminal	Function	Description
TB1	A+	A+ pulse signal input	<ul style="list-style-type: none"> <li>Inputs for the A, B, and Z pulses from the PG</li> <li>Signal level matches RS-422</li> </ul>
	A-	A- inverse pulse input	
	B+	B+ pulse signal input	
	B-	B- inverse pulse input	
	Z+	Z+ pulse signal input	
	Z-	Z- inverse pulse input	
	SD	NC pin (open)	For use when cables shields should not be grounded
	FE	Ground	Used for grounding shielded lines
TB2	IP	PG power supply	<ul style="list-style-type: none"> <li>Output voltage: 12.0 V <math>\pm</math> 5% or 5.5 V <math>\pm</math> 5%</li> <li>Max. output current: 200 mA</li> </ul>
	IG	PG power supply common	
	SG	Monitor signal common	<ul style="list-style-type: none"> <li>Output signal for monitoring A, B, and Z pulses from the PG</li> <li>Signal level matches RS-422</li> </ul>
	a+	A pulse monitor signal	
	a-	A pulse inverse monitor signal	
	b+	B pulse monitor signal	
	b-	B pulse inverse monitor signal	
	z+	Z pulse monitor signal	
	z-	Z pulse inverse monitor signal	


### Wiring Example for gearless Synchronous motor with incremental

This example is use a HEIDENHAIN ERN1321 incremental encoder. First note the correspondence of cables and their colors. This correspondence is written on the encoder manual. For example, on the encoder is written:

+5Vdc	0V	A	B	Z	$\bar{A}$	$\bar{B}$	$\bar{Z}$
Red	Black	Orange	Brown	Violet	Yellow	blue	Green

Jumper CN3, on the PG-X3 card, determines the voltage for the PG power supply. The voltage level is set by the positioning the jumper as shown below.

PG Power Supply Voltage (IP)		
Voltage Level	5.5 V 5% (default)	12.0 V 5%
Jumper	<div> <div>5.5 V</div> <div>12 V</div> </div> 	

On Block terminal TB1 of PG-X3, the terminal A+ corresponds to phase A, so this terminal should be connected with the encoder's ORANGE cable. The encoder power supply should be 5Vdc, and this voltage must be selected from the jumper CN3. The jumper CN3 must be on the position for 5Vdc .

The wiring of PG-X3 with HEIDENHAIN ERN1321 encoder is like the table below:

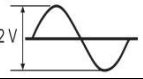
Terminal Block	Terminal	Function	Description
TB1	A+	ORANGE	<ul style="list-style-type: none"> <li>Inputs for the A and B from the PG</li> <li>Signal level matches RS-422</li> </ul>
	A-	YELLOW	
	B+	BROWN	
	B-	BLUE	
	Z+	VIOLET	
	Z-	GREEN	
	FE	SHIELD	Used for grounding shielded lines
TB2	IP	RED	<ul style="list-style-type: none"> <li>Output voltage: 12.0 V <math>\pm</math> 5% or 5.5 V <math>\pm</math> 5%</li> <li>Max. output current: 200 mA</li> </ul>
	IG	BLACK	



## C. PG Option Card for Synchronous Gearless Motors with absolute EnDat encoder .

### 1. Wiring the PG-F3.

This PG Option Card is used with three phases encoders. The terminal specifications for the PG-F3 are given in the following table:



Terminal Block	Terminal	Function	Description	Specifications
TB1	IP	Encoder power supply	Supplies power to the encoder.	<ul style="list-style-type: none"> <li>• Jumper with terminal CN3 to select the power supply voltage, 8 V or 5 V.</li> <li>• Voltage range: 5 V <math>\pm 5\%</math>, 330 mA 8 V <math>\pm 10\%</math>, 150 mA</li> <li>Note: Number of connections to terminals IP and IG differs by wiring length when the power supply is set for +5 V <math>\pm 5\%</math>.</li> <li>• Up to 10 m: One or two connections to both IP and IG.</li> <li>• 10 to 20 m: Two connections to both IP and IG.</li> </ul>
	IG	Encoder power supply common		
	DT	Comm. Data signal I/O		
	$\overline{\text{DT}}$	Inverse comm. data signal I/O	Reads and processes encoder data.	Signal level: RS-485 protocol
	B+	B pulse signal input	Input for the B pulse sinewave from the encoder.	<ul style="list-style-type: none"> <li>• Max. input frequency: 50 kHz</li> <li>• Input signal differential: B+ - B-</li> </ul> 
	B-	Inverse B pulse signal input		
	b+	B pulse monitor signal output	Outputs a ratio of the B pulse frequency.	<ul style="list-style-type: none"> <li>• Output method: Line driver</li> <li>• Output voltage: RS-422 level</li> <li>• Possible resolution: 1/n</li> <li>Set F1-06 to monitor the pulse signal. Varies by drive models.</li> </ul>
	b-	Inverse B pulse monitor signal output		
TB2	IP	Encoder power supply	Supplies power to the encoder.	Connects to terminal IP on the option card.
	IG	Encoder power supply common		Connects to terminal IG on the option card.
	CK	Comm. Clock signal output	Outputs the comm. clock signal to the encoder	Signal level: RS-485 protocol
	$\overline{\text{CK}}$	Inverse comm. clock signal Output		
	A+	A pulse signal input	Input for the A pulse sinewave from the encoder.	<ul style="list-style-type: none"> <li>• Max. input frequency: 50 kHz</li> <li>• Input signal differential: A+ - A-</li> </ul>
	A-	Inverse A pulse signal input		
	a+	A pulse monitor signal output	Outputs a ratio of the A pulse frequency.	<ul style="list-style-type: none"> <li>• Output method: Line driver</li> <li>• Output voltage: RS-422 level</li> <li>• Possible resolution ratio: 1/n</li> <li>Set F1-06 to monitor the pulse signal. Varies by drive models.</li> </ul>
	a-	Inverse A pulse monitor signal Output		
	FE	Ground	Ground terminal for shielded cable.	Used for grounding shielded line.

### Wiring Example for gearless Synchronous motor with Absolute EnDat encoder.


This example is use a HEIDENHAIN ECN413 EnDat encoder. First note the correspondence of cables and their colors. This correspondence is written on the encoder manual. For example, on the encoder is written:

Up	Sensor Up	0V	Sensor 0V	CLOCK	$\overline{\text{CLOCK}}$	DATA	$\overline{\text{DATA}}$	A+	A-	B+	B-
Brown/Green	Blue	White/Green	White	Purple	Yellow	Gray	Pink	Green/Black	Yellow/Black	Blue/Black	Red/Black

Jumper CN3, on the PG-X3 card, determines the voltage for the PG power supply. The voltage level is set by the positioning the jumper as shown below.

PG Power Supply Voltage (IP)		
Voltage Level	5.0 V 5% (default)	8.0 V 5%
Jumper		

On Block terminal TB1 of PG-X3, the terminal DT corresponds to DATA signal, so this terminal should be connected with the encoder's GRAY cable. The encoder power supply should be 5Vdc, and this voltage must be selected from the jumper CN3. The jumper CN3 must

be on the position for 5Vdc .

The wiring of PG-X3 with HEIDENHAIN ERN1321 encoder is like the table below:

Option Card	Encoder Cable	
Terminal	Color	Encoder Side
IP	Brown/Green	Up
	Blue	Sensor Up
IG	White/Green	0V
	White	Sensor 0V
CK	Purple	CLOCK
$\overline{\text{CK}}$	Yellow	$\overline{\text{CLOCK}}$
DT	Gray	DATA
$\overline{\text{DT}}$	Pink	$\overline{\text{DATA}}$
A+	Green/Black	A+
A-	Yellow/Black	A-
B+	Blue/Black	B+
B-	Red/Black	B-

### 3) Auto-tuning

Auto-tuning is the first step of installation. This mode, sets motor parameters automatically. Therefore some motor data which are usually written at the nameplate must be input and the Auto-tuning has to be performed. Auto-tuning is necessary for geared asynchronous motors or gearless synchronous motors.

#### **A. Asynchronous Motors**

For asynchronous motors, one can use two different Auto-tuning modes, rotating auto-tuning and non-rotating auto-tuning.

##### **1. Rotating Auto-tuning**

Use this tuning mode only, if the motor can rotate freely which means that the ropes have to be removed and mechanical brake must be opened.

The procedure for rotating autotune can be made with the following steps.

**Step 1.** Turn the main power ON. Be sure that the lift is on maintenance Mode. Energize the motor contactor K6 and the brake contactor K9, manually.

**Step 2.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T1-01	0: Set T1-01 to 0 for rotating Auto-tuning.
2.	T1-02	Motor output power in kilowatts.
3.	T1-03	Set the rated voltage of the motor.
4.	T1-04	Set the rated current of the motor.
5.	T1-05	Set the rated frequency of the motor.
6.	T1-06	Set the number of motor poles.
7.	T1-07	Set the base speed of the motor in rpm.
8.	T1-08	Set the number of PG pulses per revolution, in case of using encoder.
9.	T1-09	No load current of motor. Usually this setting is not necessary.
10.	T1-10	Motor Rated slip. Usually this setting is not necessary.

**Step 3.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

**Step 4.** Open the de-energize the motor contactor K6.

**Step 5.** Check the rotation of the motor. If the rotation is opposite, change the value of the parameter b1-14. If using a close loop control mode and parameter b1-14 is changed, be sure also to change the direction of the motor encoder (F1-05) to match the direction of the UP and DOWN commands.

## 2. Stationary Auto-tuning

Use this tuning mode only, if the motor **cannot** rotate freely which means that the ropes cannot be removed and mechanical brake must be closed.

The procedure for stationary auto-tuning can be made with the following steps.

**Step 1.** Turn the main power ON. Be sure that the lift is on maintenance Mode. Energize the motor contactor K6 manually.

**Step 2.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T1-01	1: Set T1-01 to 1 for Stationary Auto-tuning 2.
2.	T1-02	Motor output power in kilowatts.
3.	T1-03	Set the rated voltage of the motor.
4.	T1-04	Set the rated current of the motor.
5.	T1-05	Set the rated frequency of the motor.
6.	T1-06	Set the number of motor poles.
7.	T1-07	Set the base speed of the motor in rpm.
8.	T1-08	Set the number of PG pulses per revolution, in case of using encoder.
9.	T1-09	No load current of motor. Usually this setting is not necessary.
10.	T1-10	Motor Rated slip. Usually this setting is not necessary.

**Step 3.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

**Step 4.** Open the de-energize the motor contactor K6.

**Step 5.** Check the rotation of the motor. If the rotation is opposite, change the value of the parameter b1-14. If using a close loop control mode and parameter b1-14 is changed, be sure also to change the direction of the motor encoder (F1-05) to match the direction of the UP and DOWN commands.

## B. Synchronous Motors

For synchronous motors, one can use two different Auto-tuning modes, rotating auto-tuning and non-rotating auto-tuning. Also we can use absolute or incremental encoders.

### 1. Rotating Auto-tuning

Use this tuning mode only, if the motor can rotate freely which means that the ropes have to be removed and mechanical brake must be opened and EnDat encoder is used.

The procedure for rotating autotune can be made with the following steps.

**Step 1.** Turn the main power ON. Be sure that the lift is on maintenance Mode. Energize the motor contactor K6 manually.

**Step 2.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T2-01	1: Set T2-01 to 1 for stationary Auto-tuning.
2.	T2-04	Motor output power in kilowatts.
3.	T2-05	Set the rated voltage of the motor.
4.	T2-06	Set the rated current of the motor.
5.	T2-08	Set the number of motor poles.
6.	T2-09	Set the base speed of the motor in rpm.
7.	T2-16	Set the number of PG pulses per revolution, in case of using encoder.

**Step 3.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

**Step 5.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T2-01	3: Set T2-01 to 3 for Initial Magnet Pole Search Parameter Auto-tuning

**Step 6.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

**Step 7.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T2-01	10: Set T2-01 to 10 for Rotational Encoder Offset Auto-tuning.

**Step 8.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

**Step 9.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T2-01	11: Set T2-01 to 11 for Rotational Back EMF Constant Auto-tuning.

**Step 10.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

## 2. Stationary Auto-tuning

Use this tuning mode only, if the motor can not rotate freely which means that the ropes can not be removed and mechanical brake must be closed.

The procedure for stationary autotuning can be made with the following steps

**Step 1.** Turn the main power ON. Be sure that the lift is on maintenance Mode. Energize the motor contactor K6 manually.

**Step 2.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T2-01	1: Set T2-01 to 1 for stationary Auto-tuning.
2.	T2-04	Motor output power in kilowatts.
3.	T2-05	Set the rated voltage of the motor.
4.	T2-06	Set the rated current of the motor.
5.	T2-08	Set the number of motor poles.
6.	T2-09	Set the base speed of the motor in rpm.
7.	T2-16	Set the number of PG pulses per revolution, in case of using encoder.

**Step 3.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

**Step 5.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T2-01	2: Set T2-01 to 2 for Stationary Stator Resistance Auto-tuning.
2.	T2-06	Set the rated current of the motor.

**Step 6.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

**Step 7.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

	Parameter	Value
1.	T2-01	3: Set T2-01 to 3 for Initial Magnet pole search Parameters Auto-tuning.

**Step 8.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

If the error “Er22” appears, then check the follow steps:

- If case of using absolute encoder, remove the ropes from the motor, energize manually the brake contactor, and select the Rotational Encoder Offset Auto-tuning T2-10=10
- In case of using incremental encoder, change the PG option card and use an absolute encoder. And repeat the Auto-tuning procedure from step 7.

**Step 9.** Select the Auto-tuning menu and set Motor Auto-tuning Parameters as the next table:

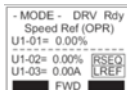


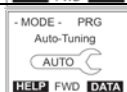

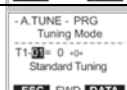

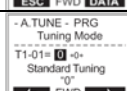

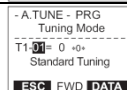
	Parameter	Value
1.	T2-01	4: Set T2-01 to 4 for Stationary Encoder Offset Auto-tuning.

**Step 10.** Press the RUN key to start the auto-tuning and wait until auto-tuning is finished.

### C. Auto-Tuning Operation Example


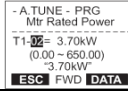

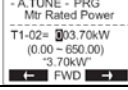




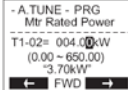

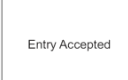
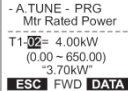
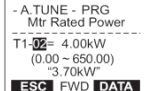

The following example demonstrates Rotational Auto-Tuning when using Open Loop Vector Control (A1-02 = 2).

- Selecting the type of Auto-tuning

STEP			Display/Result
1.	Turn on the power to the drive. The initial display appears.	▶	
2.	Press the  or  key until the Auto-Tuning display appears.	▶	
3.	Press  to begin setting parameters.	▶	
4.	Press  to select the value for T1-01.	▶	
5.	Save the setting by pressing  .	▶	Entry Accepted
6.	The display automatically returns to the display shown in Step 3.	▶	

b) Enter Data from the Motor Nameplate

After selecting the type of Auto-Tuning, enter the data required from the motor nameplate.

STEP			Display/Result
1.	Press  to access the motor output power parameter T1-02.	▶	
2.	Press  to view the default setting.	▶	
3.	Press  ,  ,  , and  to enter the motor power nameplate data in kW.	▶	
4.	Press  to save the setting.	▶	
5.	The display automatically returns to the display in Step 1.	▶	
6.	Repeat Steps 1 through 5 to set the following parameters: <ul style="list-style-type: none"> <li>• T1-03, Motor Rated Voltage</li> <li>• T1-04, Motor Rated Current</li> <li>• T1-05, Motor Base Frequency</li> <li>• T1-06, Number of Motor Poles</li> <li>• T1-07, Motor Base Speed</li> </ul>	▶	 

c) Starting Auto-Tuning

**WARNING!** Sudden Movement Hazard. The drive and motor may start unexpectedly during Auto-Tuning, which could result in death or serious injury. Ensure the areas surrounding the drive, motor and load are clear before proceeding with Auto-Tuning.







**WARNING!** Electrical Shock Hazard. High voltage will be supplied to the motor when Stationary Auto-Tuning is performed even with the motor stopped, which could result in death or serious injury. Do not touch the motor until Auto-Tuning has been completed.

**WARNING!** When performing Rotational Auto-Tuning for motor data or encoder offset, always uncouple the motor from the mechanical system (remove ropes from traction sheave). Performing Rotational Auto-Tuning with the mechanical system connected to the motor can cause hazardous situations, injury to personnel and damage to the equipment.

**NOTICE:** Rotational Auto-Tuning will not function properly if a holding brake is applied on the load. Failure to comply could result in improper operation of the drive. Ensure the motor can freely spin before beginning Auto-Tuning.



Enter the required information from the motor nameplate. Press to proceed to the Auto-Tuning start display.

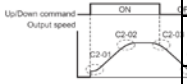
STEP			Display/Result
1.	After entering the data listed on the motor nameplate, press  to confirm.	▶	<div> - MODE - DRV  End  Tune Successful    </div>
2.	Press  to activate Auto-Tuning. The drive begins by injecting current into the motor for about 1 min, and then starts to rotate the motor.	▶	<div> - A.TUNE - DRV  Auto-Tuning  -----  0.00 Hz/ 0.00A  Tuning Ready ?  Press RUN key    </div>
3.	Auto-Tuning finishes in approximately one to two minutes.	▶	

#### 4) User Parameters Tables

Parameter Number	Name	Description	Setting Range	IS Technology Factory Setting	Control Methods			
	Display				V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
A1-00	Language Selection	Used to select the language displayed on the Digital Operator (JVOP-180 only). 0: English 1: Japanese 2: German 3: French 4: Italian 5: Spanish 6: Portuguese 7: Chinese	0 to 7	0	A	A	A	A
A1-01	Access Level Selection	0: View and set A1-01 and A1-04. U□-□□ parameters can also be viewed. 1: User Parameters (access to a set of parameters selected by the user, A2-01 to A2-32) 2: Advanced Access (access to view and set all parameters)	0 to 2	2	A	A	A	A
A1-02	Control method selection	0: V/f control 2: Open-loop vector control 3: Closed-loop vector control 7: Closed-loop vector control (PM)	0 to 7	2: for Open-loop vector 1 control 3: Closed-loop vector control 7: Closed-loop vector control (PM)	Q	Q	Q	Q
A1-03	Initialize Parameters	0: No initialization 1110: User Initialize (parameter values must be stored using parameter o2-03) 2220: 2-wire initialization. 5550: oPE04 error reset	0 to 5550	0	A	A	A	A
A1-04	Password	When the value set into A1-04 does not match the value set into A1-05, parameters A1-01 through A1-03, and A2-01 through A2-33 cannot be changed.	0 to 9999	0	A	A	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
b1-01	Speed Reference Selection	0: Digital operator 1: Analog input terminals 2: MEMOBUS/Modbus communications 3: Option card	0 to 3	0	A	A	A	A
b1-02	Up/Down Command Selection	0: Digital operator 1: Digital input terminals 2: MEMOBUS/Modbus communications 3: Option card	0 to 3	1	A	A	A	A
b1-03	Stopping Method Selection	0: Ramp to stop 1: Coast to stop	0 to 1	0	A	A	A	A
b1-06	Digital Input Reading	0: Input status is read once and processed immediately (for quick response) 1: Input is read twice and processed only if the status is the same in both readings (robust against noisy signals)	0 to 1	1	A	A	A	A
b1-08	Up/Down Command Selection while in Programming Mode	0: Up/Down command not accepted while in the Programming Mode. 1: Up/Down command accepted while in the Programming Mode. 2: Prohibit entering Programming Mode during run.	0 to 2	1	A	A	A	A
b1-14	Phase Order Selection	0: U-V-W 1: U-W-V	0 to 1	0	A	A	A	A
b2-08	Magnetic Flux Compensation Value	Sets the magnetic flux compensation as a percentage of the no-load current value (E2-03).	0% to 1000%	0	No	A	No	No
b4-01	Timer Function On-Delay Time	Used to set the on-delay and off-delay times for a digital timer output (H2-□□=12).	0.0s to 3000.0s	0	A	A	A	A
b4-02	Timer Function Off-Delay Time	The output is triggered by a digital input programmed to H1-□□=18)	0.0s to 3000.0s	0.5–0.7s	A	A	A	A
b6-01	Dwell Speed at Start	Parameters b6-01 and b6-02 set the speed to hold and the time to maintain that speed at start.	0.0% to 100.0%	0%	A	A	A	A
b6-02	Dwell Time at Start		0.0s to 10.0s	0s	A	A	A	A
b6-03	Dwell Speed at Stop	Parameters b6-03 and b6-04 set the speed to hold and the time to maintain that speed at stop.	0.0% to 100.0%	0%	A	A	A	A
b6-04	Dwell Time at Stop		0.0s to 10.0s	0s	A	A	A	A
b7-01	Droop Control Gain	Sets the speed reduction gain applied at a torque reference of 100%. Set as a percentage of motor base speed.	0.0% to 100.0%		No	No	No	A
b7-02	Droop Control Delay Time	Used to adjust the responsiveness of Droop Control.	0.03s to 2.00s		No	No	No	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
b8-01	Energy Saving Control Selection	0: Disabled 1: Enabled	0 to 1	0	No	No	No	A
b8-16	Energy Saving Control Constant (Ki)	Enter the Energy Saving value (Ki) as specified on the motor name plate. (for IPM motors only)	0.00 to 2.00	0.10	No	No	No	A
b8-17	Energy Saving Control Constant (Ki)	Enter the Energy Saving value (Ki) as specified on the motor name plate. (for IPM motors only)	0.00 to 2.00	1.00	No	No	No	A
C1-01	Acceleration Ramp 1	Sets the ramp to accelerate from 0 to maximum speed.	0.00s to 600.00s	1.80 s	A	A	A	A
C1-02	Deceleration Ramp 1	Sets the ramp to decelerate from maximum speed to 0.						
C1-03	Acceleration Ramp 2	Sets the ramp to accelerate from 0 to maximum speed.						
C1-04	Deceleration Ramp 2	Sets the ramp to decelerate from maximum speed to 0.						
C1-05	Acceleration Ramp 3	Sets the ramp to accelerate from 0 to maximum speed.						
C1-06	Deceleration Ramp 3	Sets the ramp to decelerate from maximum speed to 0.						
C1-07	Acceleration Ramp 4	Sets the ramp to accelerate from 0 to maximum speed.						
C1-08	Deceleration Ramp 4	Sets the ramp to decelerate from maximum speed to 0.						
C1-09	Emergency Stop Ramp	Sets the ramp for the Emergency Stop function.						
C1-10	Accel/Decel Setting Resolution	0: 0.01 s unit 1: 0.1 s unit	0 to 1	0	A	A	A	A
C1-11	Accel/Decel Switching Speed	Sets the speed to switch between accel/decel ramp settings.	0.0% to 100.0%	0.0%	A	A	A	A
C1-15	Inspection Deceleration Ramp	Sets the deceleration ramp used for inspection run.	0.00s to 2.00s	0.00s	A	A	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
C2-01	Jerk at Accel Start	Five different jerk values can be set. They are automatically applied as shown in the figure below. 	0.0s to 10.00s	0.5s	A	A	A	A
C2-02	Jerk at Accel End		0.0s to 10.00s	0.5s	A	A	A	A
C2-03	Jerk at Decel Start		0.0s to 10.00s	0.5s	A	A	A	A
C2-04	Jerk at Decel End		0.0s to 10.00s	0.5s	A	A	A	A
C2-05	Jerk below Leveling Speed	Sets the jerk used when the speed reference is lower than the leveling speed setting	0.0s to 10.00s	0.5s	A	A	A	A
C3-01	Slip Compensation Gain	Sets the gain for the motor slip compensation function.	0.0 to 2.5	1.0	No	A	A	No
C3-02	Slip Compensation Primary Delay Time	Adjusts the slip compensation function delay time.	0ms to 10000ms	0ms	No	A	No	No
C3-03	Slip Compensation Limit	Sets an upper limit for the slip compensation function as a percentage of motor rated slip for motor 1 (E2-02).	0% to 250%	0%	No	A	No	No
C3-04	Slip Compensation Selection during Regeneration	0: Disabled. 1: Enabled above 6 Hz. 2: Enabled whenever slip compensation is possible.	0 to 2	0	No	A	No	No
C3-05	Output Voltage Limit Operation Selection	0: Disabled. 1: Enabled. Automatically decreases motor flux when output voltage saturation is reached.	0 to 1	1	No	A	A	A
C4-01	Torque Compensation Gain	Sets the gain for the automatic torque (voltage) boost function and helps to produce better starting torque.	0.00 to 2.50	1	A	A	No	No
C4-02	Torque Compensation Primary Delay Time	Sets the torque compensation filter time.	0ms to 60000ms	0ms	No	A	No	No
C4-03	Torque Compensation at Forward Start	Sets torque compensation at forward start as a percentage of motor torque.	0.0% to 200.0%	100%	No	A	No	No
C4-04	Torque Compensation at Reverse Start	Sets torque compensation at reverse start as a percentage of motor torque.	0.0% to -200.0%	-100%	No	A	No	No
C4-05	Torque Compensation Time Constant	Sets the time constant for torque compensation at forward start and reverse start (C4-03 and C4-04).	0ms to 200ms	10ms	No	A	No	No

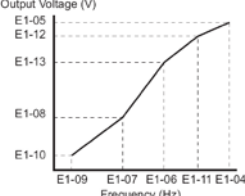
Parameter Number	Display	Description	Setting Range	IS Technology FactorySetting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
C5-01	Speed Control Loop Proportional Gain 1	Sets the proportional gain 1 of the speed control loop.	0 to 300	determined by the control mode (A1-02).	No	No	A	A
C5-02	Speed Control Loop Integral Time 1	Sets the integral time 1 of the speed control loop.	0s to 10.0s	determined by the control mode (A1-02).	No	No	A	A
C5-03	Speed Control Loop Proportional Gain 2	Sets the proportional gain 2 of the speed control loop.	0 to 300	determined by the control mode (A1-02).	No	No	A	A
C5-04	Speed Control Loop Integral Time 2	Sets the integral time 2 of the speed control loop.	0s to 10.0s	determined by the control mode (A1-02).	No	No	A	A
C5-06	Speed Control Loop Primary Delay Time Constant	Sets the filter time constant for the time from the speed loop to the torque command output.	0.0s to 0.5s	0.004s	No	No	A	A
C5-07	Speed Control Settings Switching Speed	Sets the speed for switching between proportional gain 1, 2, 3 and integral time 1, 2, 3.	0% to 100%	determined by the control mode (A1-02).	No	No	A	A
C5-08	Speed Control Loop Integral Limit	Sets the speed control loop integral upper limit as a percentage of rated torque.	0% to 400%	400%	No	No	A	A
C5-13	Speed Control Loop Proportional Gain 3	Sets the proportional gain 3 of the speed control loop.	0 to 300	determined by the control mode (A1-02).	No	No	A	A
C5-14	Speed Control Loop Integral Time 3	Sets the integral time 3 of the speed control loop.	0s to 10.0s	determined by the control mode (A1-02).	No	No	A	A
C5-16	Speed Control Loop Delay Time during Position Lock	Sets a delay to the torque command output from speed control loop during position lock.	0s to 0.5s	0.0s	No	No	A	A
C5-19	Speed Control Loop Proportional Gain Time during Position Lock	Sets the Speed Control Loop Proportional gain used during Position Lock	0 to 300	determined by the control mode (A1-02).	No	No	A	A
C5-20	Speed Control Loop Integral Time during Position Lock	Sets the Speed Control Loop Integral time used during Position Lock.	0s to 10.0s	0.1s	No	No	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
C6-03	Carrier Frequency	Sets the carrier frequency.	1.0kHz to 15.0kHz	Determined by o2-04	A	A	A	A
C6-06	PWM Method	Selects PWM modulation method. 0: 2-phase/3-phase conversion 1: 2-phase modulation 2: 3-phase modulation	0 to 2	2	A	A	A	A
C6-09	Carrier Frequency during Rotational Auto-Tuning	0: Carrier Frequency = 5 kHz 1: Setting value for C6-03	0 to 1	0	No	A	A	A
C6-21	Inspection Operation Carrier Frequency	Sets the carrier frequency during Inspection Run. 0: Setting value for C6-03 1: Carrier Frequency = 2 kHz	0 to 1	1	A	A	A	A
C6-23	Carrier Frequency during Initial Motor Pole Search	Sets the carrier frequency when estimating the initial polarity. 0: Carrier Frequency = 2 kHz 1: Setting value for C6-03	0 to 1	0	A	A	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
d1-01	Speed Reference 1	Sets the Speed reference for the drive when d1-18 is set to 0 or 3. Setting units are determined by parameter o1-03.	0.0% to 100.0%	0%	A	A	A	A
d1-02	Speed Reference 2			100%				
d1-03	Speed Reference 3			15%				
d1-04	Speed Reference 4			0%				
d1-05	Speed Reference 5			8%				
d1-06	Speed Reference 6			0%				
d1-07	Speed Reference 7			0%				
d1-08	Speed Reference 8			0%				
d1-18	Speed Reference Selection Mode	Sets the mode of speed reference selection by digital inputs. 0: Use multi-speed references (d1-01 to d1-08) 1: High speed reference has priority (d1-19 to d1-23, d1-26) 2: Leveling speed reference has priority (d1-19 to d1-23, d1-26) 3: Use multi-speed references d1-02 to d1-08, no speed selection stops the drive. Drive will stop when all input terminals programmed for speed references (H1-□□= 3, 4, 5) are open.	0 to 3	3	A	A	A	A
d1-19	Nominal Speed	Sets the nominal speed reference when d1-18 = 1 or 2.	0.0% to 100.0% (PM)		A	A	A	A
			0.0Hz to 50.0Hz					
d1-20	Intermediate Speed 1	Sets intermediate speed reference 1 when d1-18 = 1 or 2.	0.0% to 100.0% (PM)		A	A	A	A
			0.0Hz to 50.0Hz					
d1-21	Intermediate Speed 2	Sets intermediate speed reference 2 when d1-18 = 1 or 2.	0.0% to 100.0% (PM)		A	A	A	A
			0.0Hz to 50.0Hz					
d1-22	Intermediate Speed 3	Sets intermediate speed reference 3 when d1-18 = 1 or 3.	0.0% to 100.0% (PM)		A	A	A	A
			0.0Hz to 50.0Hz					
d1-23	Releveling Speed	Sets speed reference for releveling when d1-18 = 1 or 2.	0.0% to 100.0% (PM)		A	A	A	A
			0.0Hz to 50.0Hz					
d1-24	Inspection Operation Speed	Sets speed reference when inspection operation is enabled.	0.0% to 100.0% (PM)	15%	A	A	A	A
			0.0Hz to 50.0Hz					
d1-25	Rescue Operation Speed	Sets the speed reference during inspection operation.	0.0% to 100.0% (PM)	8%	A	A	A	A
			0.0Hz to 50.0Hz					
d1-26	Leveling Speed	Sets leveling speed reference when d1-18 = 1 or 2.	0.0% to 100.0% (PM)	8%	A	A	A	A
			0.0Hz to 50.0Hz					



Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
d1-28	Leveling Speed Detection Level	Used when d1-18 = 0 or 3. If the speed reference selected is lower than d1-28, then the drive uses the leveling speed as the speed reference.	0.0% to 100.0% (PM)	10%	A	A	A	A
			0.0Hz to 50.0Hz					
d1-29	Inspection Speed Detection Level	Used when d1-18 = 0 or 3. If the speed reference selected is higher than d1-28 but lower or equal to d1-29, then the drive uses inspection speed as the speed reference.	d1-28 to 100.0% (PM)	20%	A	A	A	A
			d1-28 to 50.0Hz					
d6-03	Field Forcing Selection	0: Disabled 1: Enabled	0 to 1	0	No	A	A	No
d6-06	Field Forcing Limit	Sets the upper limit of the excitation current command during magnetic field forcing. A setting of 100% is equal to motor no-load current. Disabled only during DC Injection Braking.	100% to 400%	400%	No	A	A	No

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods				
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor	
E1-01	Input Voltage Setting	This parameter must be set to the power supply voltage. WARNING! Drive input voltage (not motor voltage) must be set in E1-01 for the protective features of the drive to function properly. Failure to do so may result in equipment damage and/or death or personal injury.	155V to 400V	400V	A	A	A	A	
E1-03	V/f Pattern Selection	F: Custom V/f, E1-04 through E1-13 settings define the V/f pattern	F	F	A	No	No	No	
E1-04	Maximum Output Frequency	<p>To set linear V/f characteristics, set the same values for E1-07 and E1-09. In this case, the setting for E1-08 will be disregarded. Ensure that the four frequencies are set according to these rules: <math>E1-09 \leq E1-07 \leq E1-06 \leq E1-11 \leq E1-04</math> Note that if <math>E1-11 = 0</math>, then both E1-11 and E1-12 are disabled, and the above conditions do not apply.</p> <p>Output Voltage (V)</p>  <p>Note: Some parameters may not be available depending on the control mode.</p> <ul style="list-style-type: none"><li>• E1-07, E1-08 and E1-10 are available only in the V/f control and Open Loop Vector control modes.</li><li>• E1-11, E1-12 and E1-13 are available only in the V/f control and Closed Loop Vector control modes.</li></ul>		50Hz	A	A	A	A	
E1-05	Maximum Voltage								
E1-06	Base Frequency								50Hz
E1-07	Middle Output Frequency								
E1-08	Middle Output Frequency Voltage								
E1-09	Minimum Output Frequency								
E1-10	Minimum Output Frequency Voltage								
E1-11	Middle Output Frequency 2								
E1-12	Middle Output Frequency Voltage 2								
E1-13	Base Voltage								

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
E2-01	Motor Rated Current	Sets the motor nameplate full load current in Amps. Automatically set during Auto-Tuning.		A	A	A	A	No
E2-02	Motor Rated Slip	Sets the motor rated slip. Automatically set during Auto-Tuning.	0.0Hz to 20.0Hz	Hz	A	A	A	No
E2-03	Motor No-Load Current	Sets the no-load current for the motor. Automatically set during Auto-Tuning.	0A to E2-01	A	A	A	A	No
E2-04	Number of Motor Poles	Sets the number of motor poles. Automatically set during Auto-Tuning.	2 to 48	4	A	A	A	No
E2-05	Motor Line-to-Line Resistance	Sets the phase-to-phase motor resistance. Automatically set during Auto-Tuning.	0.0Ω to 65.0Ω		A	A	A	No
E2-06	Motor Leakage Inductance	Sets the voltage drop due to motor leakage inductance as a percentage of motor rated voltage. Automatically set during Auto-Tuning.	0.0% to 40.0%		A	A	A	No
E2-07	Motor Iron-Core Saturation Coefficient 1	Sets the motor iron saturation coefficient at 50% of magnetic flux. Automatically set during Auto-Tuning.	0.0 to 0.50		No	A	A	No
E2-08	Motor Iron-Core Saturation Coefficient 2	Sets the motor iron saturation coefficient at 75% of magnetic flux. Automatically set during Auto-Tuning.	E2-07 to 0.75		No	A	A	No
E2-09	Motor Mechanical Loss	Sets the motor mechanical loss as a percentage of motor rated power (kW).	0.0% to 10.0%		No	A	A	No
E2-10	Motor Iron Loss for Torque Compensation	Sets the motor iron loss.	0W to 65535W		A	No	No	No
E2-11	Motor Rated Power	Sets the motor rated power in kilowatts (1 HP = 0.746 kW). Automatically set during Auto-Tuning.	0.0kW to 650.0kW	KW	A	A	A	No

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
E5-02	Motor Rated Power	Sets the rated capacity of the motor.	0.1kW to 650kW		No	No	No	A
E5-03	Motor Rated Current	Sets the motor rated current.			No	No	No	A
E5-04	Motor Poles	Sets the number of motor poles.	2 to 48		No	No	No	A
E5-05	Motor Stator Resistance (Single Phase)	Sets the stator resistance (1 phase value).	0.0Ω to 65.0Ω		No	No	No	A
E5-06	Motor d-Axis Inductance	Sets the d-axis inductance.	0.0mH to 600.0mH		No	No	No	A
E5-07	Motor q-Axis Inductance	Sets the q-axis inductance.	0.0mH to 600.0mH		No	No	No	A
E5-09	Motor Induction Voltage Constant 1	Sets the induced phase peak voltage in units of 0.1 mV (rad/s) [electrical angle]. When setting this parameter, E5-24 should be set to 0.0.	0.0mV to 6500.0mV		No	No	No	A
E5-11	Encoder Offset	Sets the offset between the rotor magnetic axis and the encoder zero position. Set during Encoder Offset Tuning.	-180o to 180o		No	No	No	A
E5-24	Motor Induction Voltage Constant 2	Sets the induced phase-to-phase rms voltage in units of 0.1 mV/(r/min) [mechanical angle]. When setting this parameter, E5-24 should be set to 0.0.	0.0mV to 6500.0mV		No	No	No	A

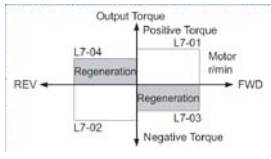
Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
F1-01	Encoder 1 Resolution	Sets the encoder resolution (number of pulses per revolution)	1 to 60000	Pulses/Revolution	No	No	A	A
F1-02	Operation Selection at PG Open Circuit (PGo)	0: Ramp to stop. Decelerate to stop using the deceleration ramp in C1-02. 1: Coast to stop. 2: Emergency Stop. Decelerate to stop using the deceleration ramp in C1-09. 3: Alarm only.	0 to 3	1	No	No	A	A
F1-03	Operation Selection at Overspeed (oS)	0: Ramp to stop. Decelerate to stop using the deceleration ramp in C1-02. 1: Coast to stop. 2: Emergency Stop. Decelerate to stop using the deceleration ramp in C1-09. 3: Alarm only.	0 to 3	1	No	No	A	A
F1-04	Operation Selection at Deviation	0: Ramp to stop. Decelerate to stop using the deceleration ramp in C1-02. 1: Coast to stop. 2: Emergency Stop. Decelerate to stop using the deceleration ramp in C1-09. 3: Alarm only.	0 to 3	3	No	No	A	A
F1-05	Encoder 1 Rotation Direction Selection	0: A phase leads B in up direction 1: B phase leads A in up direction	0 to 1	0	No	No	A	A
F1-06	PG 1 Pulse Monitor Output Division Ratio	Sets the division ratio for the pulse monitor used of the PG option card installed to connector CN5-C. By setting "xyz", the division ratio becomes = $[(1 + x) / yz]$ . If only using the A pulse for one track input, then the input ratio will be 1:1, regardless of what F1-06 is set to.	1 to 132	1	No	No	A	A
F1-08	Overspeed Detection Level	Sets the overspeed detection level as a percentage of the maximum output frequency.	0% to 120%	115%	No	No	A	A
F1-09	Overspeed Detection Delay Time	Sets the time in seconds for an overspeed situation to trigger a fault (oS).	0.0s 2.0s	0.0s	No	No	A	A
F1-10	Excessive Speed Deviation Detection Level	Sets the speed deviation detection level as a percentage of the maximum output frequency.	0% to 50%	10%	No	No	A	A
F1-11	Excessive Speed Deviation Detection Delay Time	Sets the time in seconds for a speed deviation situation to trigger a fault (dEv).	0.0s to 10.0s	0.5s	No	No	A	A
F1-14	PG Open-Circuit Detection Time	Sets the time required to trigger a PG Open fault (PGo).	0.0s to 10.0s	2.0s	No	No	A	A
F1-18	dv3 Detection Selection	0: Disabled n: Sets the number of dv3 situations that may be detected before triggering an actual dv3 fault.	0 to 10	10	No	No	No	A
F1-19	dv4 Detection Selection	0: Disabled n: Number of pulses that the A and B pulse are reversed that triggers dv4 detection.	0 5000	128	No	No	No	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
F1-20	PG Option Card Disconnect Detection 1	0: Disabled 1: Enabled	0 to 1	1	No	No	A	A
F1-29	dEv Detection Condition Selection	Selects when DEV is active. 0: After speed reference, soft starter output and motor speed have matched once. 1: After speed reference and soft starter output have matched once. 2: Always during Run	0 to 2	2	No	No	No	A
F1-51	PGoH Detection Level	Sets the level for detecting PG Hardware Fault (PGoH). Available when F1-20 = 1	1% to 100%	80%	No	No	No	A
F1-63	PG-E3 R Track Selection	0: Disabled 1: Enabled	0 to 1	0	No	No	No	A
H1-03	Terminal S3 Function Selection	Assigns a function to the multi-function digital inputs. Note: Unused terminals should be set to F.	3 to 79	3	A	A	A	A
H1-04	Terminal S4 Function Selection			4	A	A	A	A
H1-05	Terminal S5 Function Selection			55	A	A	A	A
H1-06	Terminal S6 Function Selection			53	A	A	A	A
H1-07	Terminal S7 Function Selection			9	A	A	A	A
H1-08	Terminal S8 Function Selection			F	A	A	A	A
H2-01	Terminals M1-M2 Function Selection (relay)		0 to 161	50	A	A	A	A
H2-02	Terminals M3-M4 Function Selection (relay)		0 to 161	51	A	A	A	A
H2-03	Terminals M5-M6 Function Selection (relay)		0 to 161	112	A	A	A	A
H2-04	Terminal P1-C1 Function Selection (photocoupler)		0 to 161	52	A	A	A	A
H2-05	Terminal P2-C2 Function Selection (photocoupler)		0 to 161	112	A	A	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
L1-01	Motor Overload Protection Selection	0: Disabled 1: General purpose motor (standard fan cooled) 2: Drive dedicated motor with a speed range of 1:10 3: Vector motor with a speed range of 1:100 5: PM motor with constant torque characteristics	0 to 5	1	A	A	A	A
L1-02	Motor Overload Protection Time	Sets the motor thermal overload protection (oL1) time.	0.1min to 5.0min	1.0min	A	A	A	A
L1-13	Continuous Electrothermal Operation Selection	0: Disabled 1: Enabled	0 to 1	1	A	A	A	A
L2-05	Undervoltage Detection Level (Uv)	Sets the DC bus undervoltage trip level.	300Vdc to 410Vdc	380Vdc	A	A	A	A
L3-01	Stall Prevention Selection during Acceleration	0: Disabled. 1: General purpose. Acceleration is paused as long as the current is above the L3-02 setting. 2: Intelligent. Accelerate in the shortest possible time without exceeding the L3-02 level.	0 to 2	1	A	A	No	No
L3-02	Stall Prevention Level during Acceleration	Used when L3-01 = 1 or 2. 100% is equal to the drive rated current.	0% to 150%	150%	A	A	No	No
L3-05	Stall Prevention Selection during Run	0: Disabled. Drive runs at a set frequency. A heavy load may cause speed loss. 1: Decel time 1. Uses the deceleration ramp set to C1-02 while Stall Prevention is performed. 2: Decel time 2. Uses the deceleration ramp set to C1-04 while Stall Prevention is performed.	0 to 2	1	A	No	No	No
L3-06	Stall Prevention Level during Run	Enabled when L3-05 is set to 1 or 2. 100% is equal to the drive rated current.	30% to 150%		A	No	No	No
L4-01	Speed Agreement Detection Level	L4-01 sets the speed detection level for digital output functions H2-□□=2,3,4,5. L4-02 sets the hysteresis or allowable margin for speed detection. L4-03 sets the speed detection level for digital output functions H2-□□=13,14,15,16. L4-04 sets the hysteresis or allowable margin for speed detection.	0.0% to 100.0%	0.0%	A	A	A	A
L4-02	Speed Agreement Detection Width		0.0% to 40.0%	4.0%	A	A	A	A
L4-03	Speed Agreement Detection Level (+/-)		-100.0% to 100.0%	0.0%	A	A	A	A
L4-04	Speed Agreement Detection Width (+/-)		0.0% to 40.0%	0%	A	A	A	A
L4-05	Speed Reference Loss Detection Selection	0: Stop. Drive stops when the speed reference is lost. 1: Run. Drive runs at a reduced speed when the speed reference is lost.	0 to 1	0	A	A	A	A
L4-06	Speed Reference at Reference Loss	Sets the percentage of the speed reference that the drive should run with when the speed reference is lost.	0.0% to 100.0%	80.0%	A	A	A	A
L4-13	Door Zone Level	Sets the door zone speed level. The "door zone" multi-function digital output is closed when the speed falls below this level.	0.0% to 100.0%	25%	A	A	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
L5-01	Number of Auto Restart Attempts	Sets the number of times the drive may attempt to restart after the following faults occur: GF, LF, oC, ov, PF, rr, oL1, oL2, oL3, oL4, UL3, UL4.	0 to 10	0	A	A	A	A
L5-02	Fault Output Operation during Auto Restart	0: Fault output not active. 1: Fault output active during restart attempt.	0 to 1	0	A	A	A	A
L5-04	Fault Reset Interval Time	Sets the amount of time to wait between performing fault restarts.	0.5s to 600.0s	10.0s	A	A	A	A
L5-06	Under Voltage Fault Restart Selection	0: Same as L5-01 condition 1: Always automatically reset UV1	0 to 1	1	A	A	A	A
L6-01	Torque Detection Selection 1	0: Disabled 1: oL3 detection only active during speed agree, operation continues after detection 2: oL3 detection always active during run, operation continues after detection 3: oL3 detection only active during speed agree, output shuts down on an oL3 fault 4: oL3 detection always active during run, output shuts down on an oL3 fault 5: UL3 detection only active during speed agree, operation continues after detection 6: UL3 detection always active during run, operation continues after detection 7: UL3 detection only active during speed agree, output shuts down on an oL3 fault 8: UL3 detection always active during run, output shuts down on an oL3 fault	0 to 8	0	A	A	A	A
L6-02	Torque Detection Level 1	Sets the overtorque and undertorque detection level. Default	0% to 300%	150%	A	A	A	A
L6-03	Torque Detection Time 1	Sets the time an overtorque or undertorque condition must exist to trigger torque detection 1.	0.0s to 10.0s	0.1s	A	A	A	A
L6-04	Torque Detection Selection 2	0: Disabled 1: oL4 detection only active during speed agree, operation continues after detection 2: oL4 detection always active during run, operation continues after detection 3: oL4 detection only active during speed agree, output shuts down on an oL4 fault 4: oL4 detection always active during run, output shuts down on an oL4 fault 5: UL4 detection only active during speed agree, operation continues after detection 6: UL4 detection always active during run, operation continues after detection 7: UL4 detection only active during speed agree, output shuts down on an oL4 fault 8: UL4 detection always active during run, output shuts down on an oL4 fault	0 to 8	0	A	A	A	A
L6-05	Torque Detection Level 2	Sets the overtorque and undertorque detection level.	0% to 300%	150%	A	A	A	A
L6-06	Torque Detection Time 2	Sets the time an overtorque or undertorque condition must exist to trigger torque detection 2.	0.0s to 10.0s	0.1s	A	A	A	A



Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
L7-01	Forward Torque Limit	Sets the torque limit value as a percentage of the motor rated torque. Four individual quadrants can be set.	0% to 300%	300%	No	A	A	A
L7-02	Reverse Torque Limit		0% to 300%	300%	No	A	A	A
L7-03	Forward Regenerative Torque Limit		0% to 300%	300%	No	A	A	A
L7-04	Reverse Regenerative Torque Limit		0% to 300%	300%	No	A	A	A
L8-02	Overheat Alarm Level	An overheat alarm will occur if the heatsink temperature exceeds the level set in L8-02.	50oC to 150oC	75oC	A	A	A	A
L8-03	Overheat Pre-Alarm Operation Selection	0: Ramp to stop. A fault is triggered. 1: Coast to stop. A fault is triggered. 2: Emergency Stop. Decelerate to stop using the deceleration ramp in C1-09. A fault is triggered. 3: Continue operation. An alarm is triggered.	0 to 3	3	A	A	A	A
L8-05	Input Phase Loss Protection Selection	Selects the detection of input current phase loss, power supply voltage imbalance, or main circuit electrolytic capacitor deterioration. 0: Disabled 1: Enabled always 2: Enabled during operation 3: Enabled during constant speed	0 to 3	0	A	A	A	A
L8-06	Input Phase Loss Detection Level	When ripple is observed in the DC bus, expansion of the input bias is calculated and becomes the input phase if the difference between the max and minimum values of the ripple are greater than L8-06. Detection Level = 100% = Voltage class x 0.414(determines standards for setting values)	0.0% to 50.0%		A	A	A	A
L8-07	Output Phase Loss Protection Selection	0: Disabled 1: Enabled (triggered by a single phase loss) 2: Enabled (triggered when two phases are lost)	0 to 2	0	A	A	A	A
L8-09	Output Ground Fault Detection Selection	0: Disabled 1: Enabled	0 to 1	1	A	A	A	A
L8-10	Heatsink Cooling Fan Operation Selection	0: During run only. Fan operates only during run and for L8-11 seconds after stop. 1: Fan always on. Cooling fan operates whenever the drive is powered up. 2: Temperature controlled operation.	0 to 2	0	A	A	A	A
L8-11	Heatsink Cooling Fan Off Delay Time	Sets a delay time to shut off the cooling fan after the Up/Down command is removed when L8-10 = 0.	0s to 300s	60s	A	A	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
L8-12	Ambient Temperature Setting	Enter the ambient temperature. This value adjusts the oL2 detection level.	-10oC to 50oC	40oC	A	A	A	A
L8-15	oL2 (drive overload) Characteristics Selection at Low Speeds	0: No oL2 level reduction below 6 Hz. 1: oL2 level is reduced linearly below 6 Hz. It is halved at 0 Hz.	0 to 1	1	A	A	A	A
L8-27	Overcurrent Detection Gain	Sets the gain for overcurrent detection as a percentage of the motor rated current. Overcurrent is detected using the drive's overcurrent level or the value set to L8-27, whichever is lower.	0.0% to 300.0%	300.0%	No	No	No	A
L8-29	Current Unbalance Detection (LF2)	0: Disabled 1: Enabled	0 to 1	1	No	No	No	A
L8-35	Installation Selection	0: IP20 enclosure drive 2: NEMA Type 1 enclosure	0 to 2		A	A	A	A
L8-38	Automatic Torque Boost Selection	Torque Boost increases the output current limit while decreasing the carrier frequency when the output current exceeds a certain value. 0: Disabled 3: Enabled	0 to 3	0	A	A	A	A
L8-39	Reduced Carrier Frequency	Sets the reduced carrier frequency used by the Torque Boost function.	1.0kHz to 15.0kHz	3.0kHz	A	A	A	A
L8-55	Internal Braking Transistor Protection	0: Disabled. L8-55 should be disabled when using a regen converter or an optional braking unit. 1: Protection enabled.	0 to 1	1	A	A	A	A
L8-62	Operation Selection at Input Phase Loss	Sets stopping method when a Input phase loss fault (PF) occurs. See parameter L8-05. 0: Ramp to Stop - Decelerate to stop using the deceleration ramp in C1-02. 1: Coast to Stop 2: Emergency Stop - Decelerate to stop using the deceleration ramp in C1-09. 3: Alarm only - Drive continues operation.	0 to 3	1	A	A	A	A
L8-77	Oscillation Suppression	Used to suppress speed oscillations that occur with an unloaded motor and that have the same frequency as the output frequency.	-100 to 100	0	A	A	A	A
L8-88	Safe Disable Operation Mode	All Modes 0: Mode 0 (Ready Signal Off and Alarm Output on when Safe Disable Inputs open) 1: Mode 1 (Ready Signal On and Alarm Output off when Safe Disable Inputs open, Varispeed L7 compatible)	0 to 1	1	A	A	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector
					V/f	Open Loop Vector	Closed Loop Display Vector	
n2-01	Speed Feedback Detection Control (AFR) Gain	Sets the internal speed feedback detection control gain in the automatic frequency regulator (AFR). If hunting occurs, increase the set value. If response is low, decrease the set value.	0.0 to 10.0	1.0	No	A	No	No
n2-02	Speed Feedback Detection Control (AFR) Time Constant 1	Sets the time constant used for speed feedback detection control (AFR).	0ms to 2000ms	50ms	No	A	No	No
n2-03	Speed Feedback Detection Control (AFR) Time Constant 2	Sets the AFR time constant to be used during regen.	0ms to 2000ms	750ms	No	A	No	No
n5-01	Inertia Compensation Selection	0: Disabled 1: Enabled	0 to 1	0	No	No	A	A
n5-02	Motor Acceleration Time	Sets the time required to accelerate the motor at 100% torque from 0 to the nominal speed.	0.001s to 10.000s	0.1	No	No	A	A
n5-03	Inertia Compensation Gain	Sets the ratio between motor and load inertia. Lower this setting if overshoot occurs at the end of acceleration.	0.0 to 100.0	1.0	No	No	A	A
n6-01	Online Tuning Selection	0: Disabled 1: Line-to-line resistance tuning 2: Voltage correction.	0 to 2	2	No	A	No	No
n6-05	Online Tuning Gain	Decrease this setting for motors with a relatively large rotor time constant. If overload occurs, increase this setting slowly in increments of 0.1.	0.1 to 50.0	1.0	No	A	No	No
n8-01	Initial Polarity Estimation Current	Sets the current used for initial rotor position estimation as a percentage of the motor rated current (E5-03). If the motor nameplate lists an "Si" value, that value should be entered here.	0% to 100%	150%	No	No	No	A
n8-02	Pole Attraction Current	Sets the current during initial polar attraction as a percentage of the motor rated current. Enter a high value when attempting to increase starting torque.	0% to 150%	80%	No	No	No	A
n8-29	q-Axis Current Control Gain during Normal Operation	Sets the q axis proportional gain for the normal control range.	0 rad/s to 2000 rad/s	1000 rad/s	No	No	No	A
n8-30	q-Axis Current Control Integral Time during Normal Operation	Sets the q axis integral time for the normal control range.	0.0ms to 100.0ms	10.0ms	No	No	No	A
n8-32	d-Axis Current Control Gain during Normal Operation	Sets the d axis proportional gain for the normal control range.	0 rad/s to 2000 rad/s	1000 rad/s	No	No	No	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
n8-33	d-Axis Current Control Integral Time during Normal Operation	Sets the d axis integral time for the normal control range.	0.0ms to 100.0ms	10.0ms	No	No	No	A
n8-35	Initial Rotor Position Detection Selection	1: High frequency injection 2: Pulse injection	1 to 2	1	No	No	No	A
n8-36	High Frequency Injection Level Sets	Sets the frequency in Hz for the superimposed signal used for superimposed harmonics.	25Hz to 1000Hz	500Hz	No	No	No	A
n8-37	High Frequency Injection Amplitude	Sets the amplitude for superimposed harmonics according to the voltage class of the motor. Adjust this value when there is too much or too little current as a result of the settings assigned to motor parameters.	0.0% to 99.9%	20.0%	No	No	No	A
n8-62	Output Voltage Limit	Prevents output voltage saturation. Should be set just below the voltage provided by the input power supply.	0.0V to 230.0V	200.0V	No	No	No	A
n8-81	High Frequency Injection during Rescue Operation	Sets the frequency used for Polar Detection Method 1 during Rescue Operation.	25Hz to 1000Hz	90Hz	No	No	No	A
n8-82	High Frequency Injection Amplitude during Rescue Operation	Sets the amplitude for High Frequency Injection during Rescue Operation as a percentage of the voltage (200 V or 400 V).	0.1% to 99.9%	15.0%	No	No	No	A
n8-84	Polarity Detection Current	Sets the current level (E5-03) as a percentage for detecting polarity during Initial Polarity Estimation.	0% to 150%	100%	No	No	No	A
n8-86	Magnet Pole Search Error Detection Selection	0: Disabled 1: Enabled	0 to 1	0	No	No	No	A
n9-60	A/D Conversion Start Delay	Sets a delay time for starting the current signal A/D conversion. This value seldom needs to be changed.	0.0μs to 40.0μs	14.0μs	No	No	No	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
S1-01	Zero Speed Level at Stop	Determines the speed to begin applying DC Injection (or Position Lock) when the drive is ramping to stop (b1-03 = 0). Set as a percentage of the maximum output frequency (E1-04).	0.0% to 9.999%	0.5Hz	A	A	A	A
S1-02	DC Injection Current at Start	Determines the amount of current to use for DC Injection at start. Set as a percentage of the drive rated current	0% to 100%	50%	A	A	No	No
S1-03	DC Injection Current at Stop	Determines the amount of current to use for DC Injection at stop. Set as a percentage of the drive rated current.	0% to 100%	50%	A	A	No	No
S1-04	DC Injection/ Position Lock Time at Start	Determines how long the drive should perform DC Injection at start. In CLV and CLV/PM, S1-04 determines how long Position Lock should be performed. A setting of 0.00 disables S1-04.	0.0s to 10.0s	0.7s	A	A	A	A
S1-05	Brake Release Delay Time	Determines how long the drive should perform DC Injection at stop. In CLV and CLV/PM, S1-05 determines how long Position Lock should be performed. A setting of 0.00 disables S1-05.	0.0s to 10.0s	0.7s	A	A	A	A
S1-06	Brake Release Delay Time	Determines the delay time between the start of DC injection/Position Lock and setting the brake control command (H2-□□=50) in order to release the brake at the beginning of the ride.	0.0s to 10.0s	0.5s	A	A	A	A
S1-07	Brake Close Delay Time	Determines the delay time between reaching Zero Speed (S1-01) and resetting the brake control command (H2-□□= 50) in order to apply the brake at the end of the ride.	0.0s to S1-05	0.5s	A	A	A	A
S1-10	Run Command Delay Time	Sets the time that must pass after the Up/Down command is entered until the drive internal Run command is set and the ride is started.	0.0s to 1.0s	0.1s	A	A	A	A
S1-11	Output Contactor Open Delay Time	Determines the delay time between shutting off the output of the drive and resetting the contactor control command (H2-□□= 51) in order to release the motor contactor after a ride has finished.	0.0s to 1.0s	0.1s	A	A	A	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
S2-01	Motor Rated Speed	Sets the motor rated speed.	300rpm to 1800rpm	1380rpm	A	No	No	No
S2-02	Slip Compensation Gain in Motoring Mode	Slip compensation for leveling speed can be set separately for motoring and regenerative states. This can help improve the accuracy of leveling.	0.0 to 5.0	0.7	A	A	No	No
S2-03	Slip Compensation Gain in Regenerative Mode		0.0 to 5.0	1.0	A	A	No	No
S2-05	Slip Compensation Torque Detection Delay Time	Sets a delay time before detecting torque for slip compensation.	0ms to 10000ms	1000ms	A	A	No	No
S2-06	Slip Compensation Torque Detection Filter Time Constant	Sets the filter time constant applied to the torque signal used for the slip compensation value calculation.	0ms to 2000ms	500ms	A	A	No	No
S3-01	Position Lock Gain at Start 1	Sets gain levels 1 and 2 for the Position Lock function. Position Lock at start attempts to keep the car position when opening the brake in order to avoid roll back.	0 to 100	5	No	No	A	A
S3-02	Position Lock Gain at Start 2 (Anti Rollback Gain)		0.0 to 100.0	0.0	No	No	A	A
S3-03	Position Lock Gain at Stop	Sets the Position Lock gain at stop. Position Lock at stop keeps the car in position until the brake has been applied entirely.	0 to 100	5	No	No	A	A
S3-04	Position Lock Bandwidth	Determines the bandwidth around the stop position in which a digital output programmed for "Within Position Lock Bandwidth" (H2-□□= 33) is closed.	0 to 16383	10	No	No	A	A
S3-10	Starting Torque Compensation Increase Time	Sets a time constant for the torque reference to reach 300%. Enabled by setting an analog input terminal for torque compensation (H3-□□= 14).	0ms to 5000ms	500ms	No	No	A	A
S3-12	Starting Torque Compensation Bias in Down Direction	Adds a bias to torque compensation value from the load cell when moving in down direction.	-40.0% to 40.0%	0	No	No	A	A
S3-14	Torque Compensation Fade Out Speed	Sets the speed level for torque compensation to fade out during the time determined by S3-15. Sets as a percentage of the maximum output frequency (E1-04). A setting of 0.0% essentially disables this function.	0.0% to 100.0%	0.0%	No	No	A	A
S3-15	Torque Compensation Fade Out Time	Sets the time for torque compensation to fade out once motor speed reaches the level set in S3-14.	0ms to 5000ms	1000ms	No	No	A	A
S3-16	Torque Limit Reduction Time	Determines the reduction rate used bring the internal torque reference value down to zero after Position Lock at Stop has finished.	0ms to 10000ms	100ms	No	No	No	A
S3-25	DC Injection Gain in Regenerative Operation	Sets the gain level applied to the DC injection current at stop (S1-03) for when the load is 100% regenerative. The current applied during DC Injection at stop is determined as S1-03 □ S3-25.	0% to 400%	100%	No	A	No	No

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
S3-26	DC Injection Gain in Motoring Operation	Sets the gain level applied to the DC injection current at stop (S1-03) for when the load is 100% motoring. The current applied during DC Injection at stop is determined as S1-03 $\times$ S3-26.	0% to 400%	20%	No	A	No	No
S3-27	Torque Compensation Value with Load Condition 1	Used for starting torque compensation utilizing a load cell signal. Sets the torque compensation value for load condition 1.	-100% to 100%	-50%	No	No	A	A
S3-28	Torque Compensation Value with Load Condition 2	Used for starting torque compensation utilizing a load cell signal. Sets the torque compensation value for load condition 2.	-100% to 100%	50%	No	No	A	A
S3-29	Analog Input from Load Cell with Load Condition 1	Used for starting torque compensation utilizing a load cell signal. Sets the analog signal level from the load cell for load condition 1.	-100% to 100%	0.0%	No	No	A	A
S3-30	Analog Input from Load Cell with Load Condition 2	Used for starting torque compensation utilizing a load cell signal. Sets the analog signal level from the load cell for load condition 2.	-100% to 100%	100%	No	No	A	A
S3-34	Anti-Rollback Torque Bias 1	Sets the Anti-Rollback Bias applied at small position deviations during Position Lock at start.	-0.0% to 100%	0.0%	No	No	No	A
S3-35	Anti-Rollback Torque Bias 2	Sets the Anti-Rollback Bias applied at large position deviations during Position Lock at start.	-0.0% to 100%	0.0%	No	No	No	A
S3-37	Position Deviation Level to Apply ARB Torque Bias 1	Sets the position deviation level to active at Anti-Rollback Torque Bias 1 (S3-34).	0 to 32767	0	No	No	No	A
S3-38	Position Deviation Level to Apply ARB Torque Bias 2	Determines the position deviation level for when the drive should switch from the torque bias set in S3-34 to the torque bias set in S3-35.	0 to 32767	0	No	No	No	A
S3-39	Anti-Rollback Integral Gain	Determines the drive's responsiveness for Anti-Rollback during Position Lock.	-30.0 to 30.0	0.0	No	No	No	A
S3-40	Anti-Rollback Movement Detection	Sets the amount of pulses for movement detection during Anti-Rollback.	0 pulse to 100 pulses	1 pulse	No	No	No	A
S3-41	Position Lock Gain at Start 2 Reduction	Sets a reduction factor for the Position Lock Gain at Start 2 (Anti-Rollback Gain) set in parameter S3-02.	0.0 to 1.0	0.5	No	No	No	A

Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			
					V/f	Open Loop Vector	Closed Loop Display Vector	Closed Loop Display Vector PM Motor
S4-01	Light Load Direction Search Selection	0: Disabled 1: Enabled 2: Enabled for Motor 1 only	0 to 2	0: Disabled	A	A	A	A
				2: Enabled				
S4-02	Light Load Direction Search Method	Determines how the drive detects the light load direction. 0: Output Current 1: Regenerative direction detection	0 to 1	1	A	A	A	A
S4-03	Light Load Direction Search Time	Sets the time to perform Light Load Direction Search	0.0s to 5.0s	1.0s	A	A	A	A
S4-04	Light Load Direction Search Speed Reference	Sets the speed reference to use during Light Load Direction Search.	0.0% to 20.0%	5%	A	A	A	A
S4-05	Rescue Operation Torque Limit	Sets a time limit for Light Load Direction Search.	0% to 300%	100%	A	A	A	A
S4-06	Rescue Operation Power Supply Selection	0: Battery 1: UPS (single-phase) 2: UPS (3-phase)	0 to 2	1	A	A	A	A
S4-07	UPS Power	Sets the capacity of the UPS.	0.0kVA to 100.0kVA	UPS rated capacity	A	A	A	A
S4-08	UPS Operation Speed Limit Selection	Determines how a speed limit should be applied to the Rescue Operation speed (d1-25) when operating from a UPS. 0: Disabled 1: Enabled until Light Load Direction Search is complete 2: Enabled until stop	0 to 2	2	A	A	A	A
S4-12	DC Bus Voltage during Rescue Operation	Sets the DC bus voltage during Rescue Operation.	0V to 800V	0V	A	A	A	A
S4-13	Rescue Operation Power Supply Deterioration Detection Level	Determines at which level of backup power supply deterioration a PF5 fault is triggered.	10% to 100%	80%	A	A	A	A
S5-01	Short Floor Operation Selection	0: Disabled 1: Enabled	0 to 1	0	A	A	A	A
S5-02	Nominal Speed for Short Floor Calculation	When d1-18 (Speed Priority Selection) is set to 0 or 3, S5-02 determines the rated speed used during Short Floor.	0.0% to 100.0%	0.0%	A	A	A	A



Parameter Number	Display	Description	Setting Range	IS Technology Factory Setting	Control Methods			Closed Loop Display Vector PM Motor
					V/f	Open Loop Vector	Closed Loop Display Vector	
S6-01	Motor Contactor Response Error (SE1) Detection/Reset Selection	0: Detect during stop, SE1 must be manually reset 1: Detect during stop, SE1 can be automatically reset 2: No SE1 detection	0 to 2	0	A	A	A	A
S6-02	Starting Current Error (SE2) Detection Delay Time	Sets a delay time for detecting SE2.	0.0ms to [S1-04]-[S1-06]	200ms	A	A	A	No
S6-04	Output Current Error (SE3) Detection Delay Time	Sets a delay time for detecting SE3.	0ms to 5000ms	200ms	A	A	A	No
S6-05	Brake Response Error (SE4) Detection Time	Sets a delay time for detecting SE4.	0ms to 10000ms	0ms	A	A	A	A
S6-10	Overacceleration Detection Level	If the elevator car accelerates at an abnormal rate, the drive triggers an overspeed fault (dv6) and has the motor coast to stop. Parameter S6-10 determines the acceleration rate that triggers a fault.	0.0m/s <sup>2</sup> to 20.0 m/s <sup>2</sup>	1.5m/s <sup>2</sup>	No	No	No	A
S6-11	Overacceleration Detection Time	Sets a primary delay for detecting overacceleration	0ms to 5000ms	50ms	No	No	No	A
S6-12	Overacceleration Detection Selection	0: Always enabled 1: During run only	0 to 1	0	No	No	No	A
S6-15	Speed Reference Loss Detection	Enabled or disables detection for speed reference missing (FrL). 0: Disabled 1: Enabled	0 to 1	1	A	A	A	A
S6-16	Restart after Baseblock Selection	0: No restart after Baseblock/Safe Torque-Off 1: Restart after Baseblock/Safe Torque-Off	0 to 1	0	A	A	A	A